THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte USHA VARSHNEY
and
ANGUS IAN KINGON

_____

Appeal No. 95-2138
Application 07/852,078[1]

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HEARD: September 16, 1997

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Before HAIRSTON, BARRETT, and FLEMING, ***Administrative Patent Judges***.

FLEMING, ***Administrative Patent Judge***.

DECISION ON APPEAL

[1] Application for patent filed March 13, 1992.

This is a decision on appeal from the final rejection of claims 1 through 3 and 15 through 19, all of the claims pending in the present application. Claims 4 through 14 have been withdrawn from consideration as being directed to a non-elected invention.

The invention relates to a ferroelectric thin film structure for use in non-volatile random access memory. In particular, Appellants disclose on pages 3 and 4 of the specification that the invention provides multilayers of alternating zirconate titanate (PZT) and pure $PbTiO_3$ (PT) and these alternating layers of PZT and PT overcome the prior art problems. The PZT layers provide low switching fields and the PT layers provide the maximum signal available by providing a large spontaneous polarization. On pages 7-9 of the specification, Appellants disclose that Figure 4 illustrates the ferroelectric thin film structure having a substrate S and alternating layers of PZT and PT.

The only independent claim is reproduced as follows:

1. A ferroelectric thin film structure comprising a substrate and a modulated lead zirconate titanate and $PbTiO_3$ heterostructure ferroelectric thin film formed on said substrate.

The Examiner relies on the following reference:

Swartz, "Topics in Electronic Ceramics," 25 IEEE Transactions on Electrical Insulation, no. 5, 935-987 (October 1990).

The specification is objected to under 35 U.S.C. ' 112, first paragraph, for failing to provide an enabling disclosure. Claims 1 through 3 and 15 through 19 stand rejected under 35 U.S.C. ' 112, first paragraph. Claims 1 through 3 and 15 through 19 stand rejected under 35 U.S.C. ' 103 as being unpatentable over Swartz.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the briefs[2] and answer for the respective details thereof.

[2] Appellants filed an appeal brief on October 5, 1994. We will refer to this appeal brief as simply the brief. Appellants filed an appeal reply brief on January 5, 1995. We will refer to this response as the reply brief. The Examiner stated in the

Examiner=s letter dated June 6, 1996 that the reply brief has been entered and considered but no further response by the Examiner is deemed necessary.

OPINION

We will not sustain the rejection of claims 1 through 3 and 10 through 15 under 35 U.S.C. '' 103 or 112.

The Examiner objected to the specification under 35 U.S.C. ' 112, first paragraph, for failing to teach how to use the invention. Claims 1 through 3 and 10 through 15 stand rejected under 35 U.S.C. ' 112, first paragraph, for the reasons set forth in the objection to the specification. On page 2 of the answer, the Examiner argues that the specification fails to make it clear how to use a stack of layers shown in Appellants= Figures 4, 5 and 6.

In order to comply with the enablement provision of 35 U.S.C. ' 112, first paragraph, the disclosure must adequately describe the claimed invention so that the artisan could practice it without undue experimentation. ***In re Scarbrough***, 500 F.2d 560, 566, 182 USPQ 298, 303 (CCPA 1974); ***In re Brandstadter***, 484 F.2d 1395, 1404, 179 USPQ 286, 293 (CCPA 1973); and ***In re Gay***, 309 F.2d 769, 774, 135 USPQ 311, 316 (CCPA 1962). If the Examiner had a reasonable basis for questioning the sufficiency of the disclosure, the burden shifted to the Appellants to come forward with evidence to rebut this challenge. ***In re Doyle***, 482 F.2d 1385, 1392, 179 USPQ 227, 232

(CCPA 1973), ***cert. denied***, 416 U.S. 935 (1974); ***In re Brown***, 477 F.2d 946, 950, 177 USPQ 691, 694 (CCPA 1973); and ***In re Ghiron***, 442 F.2d 985, 992,169 USPQ 723, 728 (CCPA 1971). However, the burden was initially upon the Examiner to establish a reasonable basis for questioning the adequacy of the disclosure. ***In re Strahilevitz***, 668 F.2d 1229, 1232, 212 USPQ 561, 563-64 (CCPA 1982); ***In re Angstadt***, 537 F.2d 498, 501-02, 190 USPQ 214, 217-18 (CCPA 1976); and ***In re Armbruster***, 512 F.2d 676, 677-78, 185 USPQ 152, 153 (CCPA 1975).

In claims 1 through 3 and 10 through 15, Appellants claim a ferroelectric thin film structure comprising a substrate and a modulated PZT and PT heterostructure ferroelectric thin film formed on the substrate. Thus, the claims are directed to a composition of matter. Furthermore, the utility of ferroelectric thin films has been known in electronics before Appellants' filing date and has been in use prior to Appellants' invention as evidenced by Appellants' statements found on pages 1-3 of the specification as well as prior art cited by the Examiner. In particular, Swartz shows in Table 1 on page 2 that ferroelectric thin films have been used in nonvolatile memory and transducer devices. Therefore, we find that the utility of ferroelectric thin film structures was known in the art before the filing of

Appellants' invention and that Appellants' invention is directed to a new structure of ferroelectric thin films.

The question before us now is whether Appellants have provided an enabling disclosure to make the claimed ferroelectric thin film structure. On pages 7 through 11 of the specification, Appellants disclose a preferred embodiment of the present invention in which the modulated ferroelectric thin film structure, shown in Figure 4 is fabricated by ablating bulk PZT and PT ceramics or powders. In particular, Appellants disclose the formation of the modulated ferroelectric thin film structure from individual PbO (P), ZrO_2 (Z) and TiO_2 (T) pellets. The individual pellets are ablated by the laser beam 26 in the order schematically illustrated in Figure 5(a). Figure 5(b) illustrates another preferred deposition sequence in which each PZT layer may be formed by depositing a Z layer, then a T layer and then a P layer. The PT layer is formed by depositing a P layer and then a T layer. After a careful review of Appellants' specification, drawings and claims, we find that Appellants have disclosed their claimed invention in a manner that would have enabled one of ordinary skill in the art to make and use the invention without undue experimentation.

We find that Appellants= disclosure meets the requirements of 35 U.S.C. ' 112, first paragraph. Therefore, we will not sustain the Examiner's rejection of the claims under 35 U.S.C. ' 112, first paragraph.

In regard to the rejection of claims 1 through 3 and 10 through 15 under 35 U.S.C. ' 103 over Swartz, the Examiner has failed to set forth a ***prima facie*** case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the express teachings or suggestions found in the prior art, or by implications contained in such teachings or suggestions. ***In re Sernaker***, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." ***Para-Ordnance Mfg. v. SGS Importers Int=l,*** 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), ***cert. denied***, 117 S.Ct. 80 (1996), ***citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.***, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984).

Appellants argue in the brief and the reply brief that Swartz fails to teach or suggest a Aferroelectric thin film structure comprising a substrate and a modulated lead zirconate titanate and $PbTiO_3$ heterostructure ferroelectric thin film formed on said substrate@ as recited in Appellants= claim 1. Appellants further argue that Swartz does not suggest the desirability of using the two materials, PZT and PT together on the same substrate.

Upon a careful review of Swartz, we find that Swartz does not teach or suggest a ferroelectric thin film structure as recited in Appellants= claim 1. We are not inclined to dispense with proof by evidence when the proposition at issue is not supported by a teaching in a prior art reference, common knowledge or capable of unquestionable demonstration. Our reviewing court requires this evidence in order to establish a *prima facie* case. ***In re Knapp-Monarch Co.***, 296 F.2d 230, 232, 132 USPQ 6, 8 (CCPA 1961). ***In re Cofer***, 354 F.2d 664, 668, 148 USPQ 268, 271-72 (CCPA 1966).

In addition, we find that Swartz does not suggest the desirability of using the two materials, PZT and PT, together on the same substrate. The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested

by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." ***In re Fritch***, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), ***citing In re Gordon***, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." ***Para-Ordnance***, 73 F.3d at 1087, 37 USPQ2d at 1239, ***citing W. L. Gore,*** 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-13.

In the answer, the Examiner points to the term Amodulated@ used in Appellants= claims and argues that the term should be given little patentable weight. During oral hearing, we questioned the Appellants= representative, Mr. James C. Wray, about the definition of the term Amodulated@ as recited in Appellants= claims. In response, Mr. Wray argued that the term Amodulated@ means alternating, but Mr. Wray requested permission to supplement the brief so as to provide a proper definition consistent with the usage in the specification. We granted Mr. Wray permission to supplement the brief within 24 hours from the time of the oral hearing.

Within this 24 hour period, Appellants filed a supplemental brief dated September 17, 1997 which has been entered into the

record. The supplemental brief defines the term Amodulated@ as Ato adjust to or keep in proper measure or proportion, to vary a characteristic in a periodic or intermittent manner, or to pass gradually from one state to another.@ We note that the definition provided by ***The American Heritage Dictionary*** (2d ed, Boston, Houghton Mifflin Company, 1982) at page 807 for the electronic usage of modulate is A[t]o vary the frequency, amplitude, phase, or other characteristic of (a carrier wave).@

Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision. ***In re Paulsen,*** 30 F.3d 1475, 1479, 31 USPQ 2d 1671, 1674 (Fed. Cir. 1994). Moreover, when interpreting a claim, words of the claim are generally given their ordinary and accustomed meaning, unless it appears from the specification or the file history that they were used differently by the inventor. ***Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.,*** 15 F.3d 1573, 1577, 27 USPQ2d 1836, 1840 (Fed. Cir. 1993).

We note that the definition of the term, Amodulated@ as argued by Appellants is consistent with Appellants= usage in the specification. In particular, Appellants state on page 7 of the specification that Figure 4 is a representation of a modulated

structure of ferroelectric thin film. Appellants further teach on pages 7 and 8 that modulated layers are alternating layers of PZT and PT. Furthermore, we note that Appellants= Figures 4 and 6 show alternating layers of PZT and PT. Thus, we find that the Appellants= usage of modulated PZT and PT heterostructure ferroelectric thin film refers to the alternating layers of PZT and PT illustrated in Figures 4 through 6 and as described on pages 4 through 10 of the specification.

We fail to find any suggestion to modify Swartz to provide a ferroelectric thin film structure comprising a substrate and alternating layers of PZT and PT heterostructure ferroelectric thin film formed on the substrate. Since there is no evidence in the record that the prior art suggested the desirability of such a modification, we will not sustain the Examiner=s rejection of claims 1 through 3 and 10 through 15.

We have not sustained the rejection of claims 1 through 3 and 10 through 15 under 35 U.S.C. '' 103 or 112. Accordingly, the Examiner's decision is reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)
LEE E. BARRETT Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
MICHAEL R. FLEMING Administrative Patent Judge	)

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